REMARKS

This responds to the Office Action mailed on April 6, 2005, and the references cited therewith. Reconsideration of the application is respectfully requested.

By this amendment, claims 1 – 4, 8 – 11, 14, 15, 17 – 20, 25 and 26 are amended, no claims are canceled, and no claims are added; as a result, claims 1 - 26 remain pending in this application.

§102 and §103 Rejection of the Claims

Claims 14-16 were rejected under 35 U.S.C. § 102(b) as being anticipation by Hwang (U.S. Patent No. 6,657,417).

Claims 17-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by Wittenbreder, Jr. (U.S. Patent No. 6,101,108).

Claims 1, 14 and 20-26 were rejected under 35 U.S.C. § 102(b) as being anticipated by Krein et al. (U.S. Patent No. 5,668,464).

Claims 1-13 and 17-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Jacobs et al. (U.S. Patent No. 5,777,866) in combination with Ribarich et al. (U.S. Patent No. 6,259,614).

Applicants' claims 1 – 12, for example, are directed to an active power filter that regulates DC input current drawn by the active power filter using, among other things, an output-load feedforward signal that is generated by internal circuitry of an output-load subsystem. As recited in claim 1, the output-load feedforward signal is a separate control signal that is provided by internal circuitry the output-load subsystem which draws the output current from the active power filter. This output-load feedforward signal is separate (i.e., different) from the output voltage and output current that is provided to the output-load subsystem In accordance with claim 1, the active power filter includes control circuitry to combine an integrated output-voltage

sense signal, an input-voltage sense signal and the output-load feedforward signal to generate a control signal. An example is illustrated in Applicant's FIG. 1 which shows output-load feedforward signal 114 as a separate signal generated by internal circuitry 109 of output-load subsystem 108. Signal 114 is separate from the output voltage or output current 112. Active power filter subsystem 102 uses signal 114 to help regulate the DC input current 110 drawn by subsystem 102.

Applicants find no teachings in any of the cited art in which a load provides a ***separate control signal*** to an active power filter. The cited references simply show the use either the output voltage across the load or the output current drawn by the load as a feedback signal. This is discussed in more detail below. Furthermore, the cited references are directed to AC current or power regulation, not the regulation of DC input current. This is discussed in more detail below.

Applicants' amended claim 2, for example, further recites that the output-load feedforward signal is generated by the output-load subsystem to indicate when either relative power or the output current of the output-load subsystem changes. Applicants' amended claim 2 further states that the output-voltage sense signal is measured within the active power filter and is proportional to an output voltage of the active power filter, and that the output-load feedforward signal is a separate control signal from the output-voltage sense signal and is generated by the output-load subsystem. Applicants submit that none of the cited references disclose a separate control signal provided by the load indicating when the output current changes.

Applicants' amended claim 3, for example, recites that the output-load feedforward signal indicates that either the relative power or the output current drawn by the output-load subsystem will change. This may allow the active power filter to ***anticipate*** a change in the output current draw.

Furthermore, none of the cited references teach, suggest, or motivate the combining of an integrated output-voltage sense signal, an input-voltage sense signal and an output-load feedforward signal to generate a control signal that is used to regulate input current to the active power filter, as recited in amended claim 1.

Applicant's claims 14 – 16 are directed to regulating a DC input current drawn by an active-power filter and recited integrating an output-voltage sense signal, the output-voltage

sense signal indicating the output voltage. Claim 14, as amended, also recites that the output-load feedforward signal is a separate control signal generated by internal circuitry by internal circuitry of the load subsystem.

Applicants' claims 17 – 19, as amended, recite a high-bandwidth input control loop to tightly regulate DC input current drawn using current-mode control using an output-load feedforward signal generated by internal circuitry of an output-load subsystem. Claim 17 also recites that the output-load feedforward signal is separate from the output voltage.

Applicants' amended claims 20 - 26, for example, are directed to a system that includes a load subsystem and an active power filter. The load subsystem draws output current from the active power filter and has internal circuitry to generate an output-load feedforward signal to indicate changes in the output current drawn by the load subsystem. Claim 20, as amended, recites that the output-load feedforward signal is separate from the output voltage.

Krein et al. (U.S. Patent No. 5,668,464) discloses a shunt-regulator for output ripple cancellation which may provide low output ripple. This is unlike Applicant's active power filter with regulates DC input current ripple. Furthermore, the load in Krein does not generate any sort of separate control signal. The load in Krein is simply a resistive load with an input node and a ground node (see FIGs. 1 – 5, 9 and 12 of Krein). Krein uses "output voltage feedforward to drive a compensation amplifier or switching converter" (see Krein column 2, lines 4 – 6). Krein's feedforward technology uses only input and output voltages (See Krein column 5, lines 1 – 12) and does not use a separate control signal generated by circuitry of the load.

Jacobs et al. (U.S. Patent No. 5,777,866) is concerned with active power factor correction, not an active power filter, as recited in some of Applicants' claims. Jacob's feedforward concept uses capacitor C1 feedforward in the control loop (see Jacobs FIG. 11 and column 4 lines 45 – 53). There is no teaching, suggestion or motivation in Jacobs of using a separate control signal generated by circuitry of a load subsystem as a feed-forward signal, as received in some of Applicants' amended claims. The loads in Jacobs are simply resistive elements incapable of generating any sort of feedforward signal separate from the output voltage.

Jacob's rectifiers further use only AC input current, not DC current, as recited in Applicants' amended independent claims.

Ribarich et al. (U.S. Patent No. 6,259,614) is cited by the Examiner for disclosing a charge storage element. Applicants submit that the combination of Jacobs and Ribarich does not result in Applicants' claimed invention because neither reference, either separately, or in combination, teaches, suggests or motivates the generation of an output-load feedforward signal by circuitry of a load subsystem for use in regulating DC input current of an active power filter. Ribarich's control circuit further draws only AC input current, not DC current, as recited in Applicants' amended independent claims.

Hwang (U.S. Patent No. 6,657,417) is concerned with active power factor correction in a switching power supply (see Hwang FIGs 5 and 6 and reference number 100 column 5, lines 53 – 65). Hwang does not disclose an active power filter. Hwang simply uses a feedforward signal to sense an input current. Hwang's power supply also draws AC input current, not DC current, as recited in Applicants' amended independent claims. Applicants further submit that Hwang does not teach suggest or motivate the generation of an output-load feedforward signal by circuitry of a load subsystem for use in regulating input current of an active power filter. Hwang's load is only resistive and is incapable of this (see Hwang column 5, lines 27 – 36).

Wittenbreder, Jr. (U.S. Patent No. 6,101,108) discloses a system the uses two power converters in which the second is powered by the first and so that the load voltage is the sum of the two outputs places in series (See Wittenbreder abstract). Wittenbreder is concerned with power factor correction. Wittenbreder is concerned with input current effects caused by the power converter itself, not effects caused by changing requirements of the load. Wittenbreder's power converter also draws AC input current, not DC current, as recited in Applicants' amended independent claims. Applicants find no teaching, suggestion or motivate in Wittenbreder of the generation of an output-load feedforward signal by circuitry of a load subsystem for use in regulating input current of an active power filter. In Wittenbreder, the load is simply a resistive load and cannot generate a control-type signal.

Applicant's claim 25 is directed to a satellite system in which the load subsystem is a cryogenic cooling system having a motor to drive a cryogenic-cooling pump. In claim 25, circuitry of the pump generates the output-load feedforward signal indicating that the motor will draw current. The active-power filter loosely regulates the output voltage for the motor and tightly regulates the DC input current drawn by the active-power filter based at least in part on the output-load feedforward signal. None of the cited references teach, suggest or motivate a satellite system with a cryogenic cooling system as recited in Applicants' claim 25.

Applicant's claim 26 is directed to a system for generating pulsed energy. The load subsystem comprises either a laser or RF amplifier and firing electronics which generate the output-load feedforward signal indicating that the amplifier will draw an increased or decreased current. The active-power filter loosely regulates an output voltage for the amplifier and tightly regulates the DC input current drawn by the active-power filter for the amplifier based at least in part on the output-load feedforward signal. None of the cited references teach, suggest or motivate a generating pulsed energy as recited in Applicants' claim 26.

In view of the above, Applicants submit that claims 1 – 26 are allowable over the cited art.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (480) 659-3314 or Applicant's below-named representative at 310-647-3723 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 50-0616.

Respectfully submitted,

By their Representatives,

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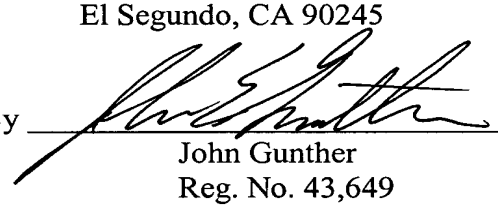
Date: June 1, 2005 By 

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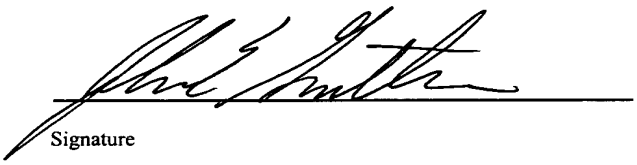
JOHN E. GUNTHER 

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